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The Effect of an Electric Field on the Falling Film Evaporation

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Abstract : This work conducted numerical simulations to examine the impact of the static electric field on a falling-film evaporation system. A constant electric field can alter the dynamics of a liquid film by modifying the heat and mass transfer properties of the system. Examine the configuration of two parallel plates within a vertical channel, where the left plate undergoes a constant heat flux and the liquid flows downward over it, while the right plate remains dry and sustains a constant temperature. The gaseous component consists of dry air and water vapor, whilst the liquid component comprises a thin coating of water. The results suggest that the electric field's impact on heat and mass transport, as well as the evaporation of the liquid sheet, is minimal. Experimental evidence demonstrates that the electric field exerts a minor influence on heat, mass transport, and liquid film evaporation at elevated electric field intensities.

Keywords : electric field, evaporation, liquid film, heat and mass transfer
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